

CLAIMS

What is claimed is:

1. A laser welding apparatus comprising:
 - a laser source outputting a laser beam;
 - a light transmitting device chosen from the group consisting essentially of a lightpipe and a lightguide, said light transmitting device being positioned downstream from said laser source, said light transmitting device operable to transmit said laser beam therethrough; and
 - an optical device positioned downstream from said light transmitting device, said optical device operable to converge light lobes exiting said light transmitting device to define a final beam width, said final beam width being narrower than a beam width exiting said light transmitting device.

2. The laser welding apparatus according to Claim 1 wherein said light transmitting device is integrally formed with said optical device to form a single unit.

3. The laser welding apparatus according to Claim 1 wherein said optical device is an optical horn having outwardly tapered bounce planes.

4. The laser welding apparatus according to Claim 3 wherein said outwardly tapered bounce planes define a first angle therebetween and said light lobes exiting said light transmitting device define a second angle, said first angle being less than said second angle.

5. A laser welding apparatus comprising:

a laser source outputting a laser beam;

a light transmitting device chosen from the group consisting essentially of a lightpipe and a lightguide, said light transmitting device being positioned downstream from said laser source, said light transmitting device operable to transmit said laser beam therethrough; and

an optical device integrally formed with said light transmitting device, said optical device being positioned downstream from said light transmitting device, said optical device being operable to converge light lobes exiting said light transmitting device to define a final beam width, said final beam width being narrower than a beam width exiting said light transmitting device.

6. The laser welding apparatus according to Claim 5 wherein said optical device is an optical horn having outwardly tapered bounce planes.

7. The laser welding apparatus according to Claim 6 wherein said outwardly tapered bounce planes define a first angle therebetween and said light lobes exiting said light transmitting device define a second angle, said first angle being less than said second angle.

8. A method of laser welding a first part to a second part, said method comprising:

outputting a laser beam;

passing said laser beam through a lightpipe to define a central light lobe and a side light lobe;

passing said laser beam exiting said lightpipe through an optical horn such that said side light lobe is generally reflected toward said central light lobe to define a combined light lobe; and

heating at least one of a first part and a second part with said combined light lobe to create a weld therebetween.

9. A method of laser welding a first part to a second part, said method comprising:

outputting a laser beam;

passing said laser beam through a lightguide to define a central light lobe and a side light lobe;

passing said laser beam exiting said lightguide through an optical horn such that said side light lobe is generally reflected toward said central light lobe to define a combined light lobe; and

heating at least one of a first part and a second part with said combined light lobe to create a weld therebetween.